REMARKS

Claim 15 is rejected under 35 USC 12, first paragraph, as failing to comply with the enablement requirement because "the first resolution is approximately satisfied by ..." is not described in the specification. Claim 15 recited: "the destination clock frequency has a first resolution". In specification paragraph 0027 description given for adjustment resolution. In paragraph 0028 attempt made to calculate adjustment resolution. Resulted value 2 to the power of –11 is too small to be practical.

Applicant has amended claim 15 to state that the destination clock frequency is adjusted utilizing an adjustment resolution being approximately satisfied by:

$$\text{Adjustment resolution} < \frac{1}{2} \frac{(HorizontalVisible)}{HorizontalTotal \bullet VerticalTotal}$$

No new matter is entered. In particular, please refer to the formula shown in paragraph [0027] of the original specification as filed. Additionally, paragraph [0026] of the original specification as filed states, "the frequency synthesizer 46 needs to adjust the destination clock frequency with an adjustment resolution sufficient to prevent overflow and underflow."

Concerning Examiner's concern that "the resulted value 2 to the power of –11 is too small to be practical", applicant refers Examiner to the following description included in paragraph [0028], "the adjustment resolution equates to a value of less than 4.47×10^4 (or less than 2^{-11}), meaning the destination clock frequency should be adjustable in increments of less than 2^{-11} of the original clock frequency." Applicant asserts that for high frequency values typically utilized for clock signals in display systems, it is indeed very practical to have an adjustment resolution being adjustable in increments of less than 2^{-11} of the original clock frequency. That is, being adjustable in increments of less than 1 / 2048 of the original clock frequency. As stated in paragraph [0028], this equates to a frequency adjustment value being less than 4.47×10^4 in the example provided, which is indeed practical to implement utilizing methods well known in the art.

Claims 5, 13, and 17 are rejected under 35 USC 112, second paragraph, as being

indefinite because it is not clear how clock change connected to generation of the output vertical sync signal (see Clock in Fig.3) can satisfy limitation of all independent claims: "the first frame rate and the second frame rate are the same", wherein the first frame rate will not have the same adjustment

Synchronously generating the output vertical sync signal with the horizontal sync signal during the last horizontal line simply involves moving the position of the output vertical sync signal within the destination frame. (See Figure 3 in that the leading edge of D_VS is moved later to instead occur at edge E7, which is synchronous with D_HS.)

If all frames in the destination display signal have the same adjustment made to the position of the output vertical sync signal within the frame, then claims 5, 13 and 17 satisfy the limitations of all the independents claims because the first frame rate and the second frame rate are substantially the same. That is, synchronously generating the output vertical sync signal with the horizontal sync signal during the last horizontal line does not change the effective second frame rate in this situation.

If only one destination frame requires the above-described adjustment of the position of the output vertical sync signal within the destination frame, for example the first time the adjustment is made, this would very slightly slow down the second frame rate for the current output frame. Therefore, the clock frequency (see Clock in Fig.3) is slightly increased to compensate for the slowed second frame rate such that the second frame rate is kept substantially the same as the first frame rate. Therefore, claims 5, 13 and 17 continue to satisfy the limitations of all the independents claims because the first frame rate and the second frame rate are substantially the same.

Claims 1-14, 16-17 are rejected under 35 USC 103a as being unpatentable over Loveridge et al (US Patent 6,545,688 B1) in view of Mizaaki et al. (US Patent 6,285,402 B1)

Applicant has amended independent claims 1, 9, and 16 to include all the limitations of dependent claims 5, 13, and 17, respectively. Claims 5, 13, and 17 are correspondingly cancelled. Applicant asserts that currently amended independent claims 1, 9, and 16 should

not be found unpatentable over Loveridge et al. in view of Miyazaki et al. because there is no motivation to combine said references to result in the present invention as claimed in claims 1, 9, and 16. In fact, said references specifically teach against such a combination and also do not teach all the limitations as claimed.

Loveridge et al. teach "the image frames in the display signal are scaled at least vertically such that the number of horizontal lines in each scaled image frame times the frame rate falls within the horizontal scanning range." (see abstract) Also, "the image is scaled (upscaled or downscaled) to have a number of lines such that the horizontal scanning frequency is within the narrow frequency range for which the display unit is designed for." (col 4, lines 4-7) The so-called "Principle" taught by Loveridge et al. in equation (5) shown in col 6 line 53 states the number of lines in the scaled image frame N'=(NxL')/L, where N is the number of lines in the source image frame, L is the horizontal line frequency of the source image frames, and L' is the desired scan image rate of the destination image frames. Additionally, equation (6) shown in col 6 line 63 shows that the vertical scaling factor V = N' /N.

Utilizing the above described principle, Loveridge et al. teach in step 260 of Figure 2 and the corresponding description at col 7, lines 26-29 that "the source image is scaled to generate a resized image having a number of lines suitable for scanning within a horizontal frequency range for which display unit 170 is designed for." Different embodiments of calculating the scaling factor are given in col 9, lines 20-28, mainly a "control circuit 360 determines a vertical scaling factor (in accordance with Equation 5 above)", and "a table (not shown) may be maintained which maps each display mode to a corresponding vertical scaling factor (or number of horizontal lines), and the table may be used in determining the number of horizontal lines in each scaled image".

Miyazaki et al., on the other hand, teach a method for performing a "horizontal size adjustment of the display screen executed by using the scanning live converter." (col 6, lines 34-35). As later explained in col 6, lines 46-50, "the sampling number of one horizontal period for reading from the field memory 10 can be changed in the range of 700 to 1000 by

externally adjusting the frequency division ratio of the frequency divider 15 in the range of 1/700 to 1/1000." As shown in Figures 5A and 5B and explained in col 7, lines 6-8, by increasing the frequency division ratio, "the effective image period in one horizontal period becomes relatively shorter, and the horizontal size becomes smaller accordingly."

Alternatively, as explained in col 7, lines 12-14 by decreasing the frequency division ratio, "since the effective image period becomes relatively longer in one horizontal period, the horizontal size can be enlarged." That is, "the horizontal size is modified by changing the frequency division ratio in this manner" (col 7, lines 19-20)

The Examiner stated that "it would be obvious to one of ordinary skill in the art at the time of the invention to incorporate teaching of Miyazaki et al. into Loveridge et al. system in order to control of effective image period", however, applicant points out that changing the image period as stated by the Examiner and taught by Miyazaki would mean the number of horizontal lines in each scaled image frame of Loveridge et al. times the frame rate would no longer fall within the horizontal scanning range. This is because Loveridge et al. teach vertically scaling the image such that the resulting particular number of horizontal lines in each scaled image frame times the frame rate falls within the horizontal scanning range. In this way, applicant asserts that Loveridge et al. actually teach against incorporating the teachings of Miyazaki et al. because changing the horizontal size of the lines according to the teachers of Miyazaki et al. would mean that resulting horizontal frame rate would no longer be within the desired horizontal scanning range. That is, if the image is vertically scaled such that the number of lines in each scaled image frame times the frame rate falls within the horizontal scanning range as is performed according to Loveridge et al., one cannot then change the horizontal size of the lines because the horizontal scanning rate would thereby be changed.

Concerning the limitations of claims 5, 13, and 17 which have now been included in claims 1, 9, and 16, respectively, applicant asserts that neither Loveridge et al. nor Miyazaki et al. disclose synchronously generating the output vertical sync signal with the horizontal sync signal during the last horizontal line, as is claimed. The Examiner stated that Miyazaki et

al. teach this limitation in col 6, lines 53-67, however, applicant respectfully points out that col 6, lines 53-67 do not teach this limitation. In particular, the word "synchronous" is not included in these lines and the relationship that the output vertical sync signal is synchronous with the horizontal sync signal during the last horizontal line is also not mentioned or suggested.

For at least the above reasons, applicant asserts that there is no motivation to incorporate the teachings of Miyazaki et al. into the system of Loveridge et al to control effective image period as was stated by the examiner because the teachings of Miyazaki et al. conflict with those of Loveridge et al. and that neither Miyazaki et al. nor Loveridge et al. teach all the limitations as claimed in the present invention in claims 1, 9, and 16. Therefore, applicant asserts that currently amended independent claims 1, 9, and 16 should be found allowable over Loveridge et al. in view of Miyazaki et al. Reconsideration of claims 1, 9, and 16 is respectfully requested.

Because claims 2-4, 6-8, 10-12, and 14-15 are dependent on claims 1, 9 and 16, if independent claims 1, 9, and 16 are found allowable, so too should dependent claims 2-4, 6-8, 10-12, and 14-15. Additionally, further comments about the patentability of the dependent claims is provided below.

Concerning dependent claims 3 and 11, applicant points out that neither Loveridge et al. nor Miyazaki et al. disclose decreasing the destination clock frequency to prevent underflow or increasing the destination clock frequency to prevent overflow, as is claimed in claims 3 and 11. The Examiner stated that this operation is "equivalent to underflow of the screen in the reference"; however, applicant respectfully refers Examiner to col 5, lines 19-23 where Miyazaki et al. explicitly state that "the frequency division ratio of the frequency divider 15 can be adjusted by supplying an UP signal for heightening the frequency division ratio or a DOWN signal for lowering it through a remote control signal". That is, the frequency division ratio of Miyazaki et al. is adjusted according to user commands to widen and shrink the horizontal screen size, which is useful, for example, because "the display apparatus often fails to display the full extent of the effective image period but often drops

edge portions thereof." (col 2, lines 42-44) Such manual user controlled operation is not equivalent to the present invention as claimed in claims 3 and 11 and therefore applicant asserts that claims 3 and 11 should be found allowable over the Loveridge et al. in view of Miyazaki et al. Reconsideration of claims 3 and 11 is respectfully requested.

Concerning dependent claims 4 and 12, applicant points out that neither Loveridge et al. nor Miyazaki et al. disclose adjusting the destination clock frequency by decreasing the destination clock frequency when the second frame rate is faster than the first frame rate or by increasing the destination clock frequency when the second frame rate is slower than the first frame rate, as is claimed in claims 4 and 12. The Examiner stated that this operation is "equivalent to underflow of the screen in the reference"; however, similar to the above comments regarding claims 3 and 11, applicant points out that Miyazaki et al. teach adjusting the frequency division ratio according to user commands to widen and shrink the horizontal screen size not in order to maintain the first and second frame rates to be substantially equal. The manual user controlled operation of Miyazaki et al. is not equivalent to the present invention as claimed in claims 4 and 12 and therefore applicant asserts that claims 4 and 12 should be found allowable over Loveridge et al. in view of Miyazaki et al. Reconsideration of claims 4 and 12 is respectfully requested.

Sincerely yours,

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